



Settlement and changing land use in the Chitwan district of Nepal

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Abstract

An important cause of sudden and dramatic land use changes in the Third World is increasing population pressures due to the processes of migration and settlement. This paper takes its point of departure in an analysis of the process of settlement at frontier land in the Terai region of Nepal with specific focus on the development of Chitwan District. The paper focuses on how population growth and the process of continued migration from the Hill Region and settlement in the Terai Region of Nepal result in considerable changes in land use and fragmentation of land-holdings. It is argued that the increasing pressures on arable land and the lack of sufficient alternative employment in Chitwan District challenge the environmental and social sustainability of the region. Furthermore, it is concluded that the concern for environmental sustainability in Nepal should ex-

tend its strong focus from the Hill Region to include the increasing social and environmental changes of the Terai Region.

Keywords

Nepal, Chitwan District, resettlement programmes, frontier settlement, land use changes, fragmentation of land-holdings, sustainability.

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Governmental policies, externally initiated development projects and academic theorizing in Nepal mirror a strong concern for the environmental fragility of the mountainous landscapes (Metz 1991, Sill and Kirkby 1991, Karan and Ishii 1996). Since the 1970s the case of Nepal has developed to a classical example of ecological disaster, not least due to Eckholm's (1976) projections and suggestions of a 'theory' of Himalayan Environmental Degradation (HED) (Blaikie and Brookfield 1987, Zurick 1988, Ives and Messerli 1989, Metz 1991, Gurung 1994). This approach assumes that the considerable population growth which Nepal has faced in the 20th century is an important activating factor for series of linked vicious cycles which results in widespread environmental and socio-economic ruin (Ives and Messerli 1989).

Despite the considerable criticism of the application of the HED scenario (Ives 1987, Blaikie and Brookfield 1987, Zurick 1988, Ives and Messerli 1989, Metz 1991), the strong emphasis on population pressures and the Hill environment have continued as the dominating framework for environmental politics and planning in Nepal also in

the 1990s (Karan and Ishii 1996, Agergaard 1998). Considering the limited space available in the present context, it would be far too ambitious to extend a discussion of the various aspects of the HED-criticism. In the present paper the HED-focus is criticised for its neglect of the Terai environment. It is emphasized that the Terai Region, exemplified by more than 40 years of settlement and development in Chitwan District characterized by rapid population growth, considerable changes in land use and increased pressures on the arable land has come to a level of endangerment (see the discussion below), which challenges the sustainability of the region and Nepal more generally. Accordingly, more integrated approaches, as regards scientific and geographic focus, than the HED theory, are needed.

There are obvious problems with referring to sustainable development (Redclift 1989, 1991, Brookfield et. al. 1995, Karan and Ishii 1996). Despite its common use, there is no clear definition of the concept, and sustainable development means different things to different people (Redclift 1991). It is important to recognise that sustainable de-

velopment refers to ecological, economic as well as social aspects of development, and a tentative definition might then be that 'sustainable development is about meeting human needs, or maintaining economic growth or conserving natural capital, or about all three' (Redclift 1991).

In the same vein as the argument of this paper Karan and Ishii (1996) argue for a better integration of the various aspects of sustainable development as regards conservation and development politics in Nepal. Likewise, Brookfield et. al. (1995) argue for the integration of biophysical and anthropocentric bases of the concept. However, they prefer the concept, 'environmental criticality', to denominate the immediate preclusion of a continuation of current human use systems. Moreover, they suggest to further distinguish between 'environmental impoverishment' and 'environmental endangerment', in order to solve the unclear definition of sustainable development as regards the time perspective (sustainable for present or future populations?) raised by Redclift (1991), as well as to highlight the degree/level of sustainability: The first, defined as a trajectory which in the medium to longer term threatens to narrow the range of possibilities for human use, and the later defined as a trajectory which threatens in the near term to 'preclude the continuation of current human use systems' (Brookfield et. al. 1995).

The discussion draws on research of the migration and settlement processes from Lamjung District to Chitwan District in Nepal. Fieldwork was carried out in both districts from September 1993 to July 1994. In Chitwan District two wards/village communities, Indrapuri and Hanuman Nagar, approx. 10 km south of the district capital Bharatpur, were selected as the starting point for the investigation and subsequently the settlers' villages of origin and family/relatives in Lamjung District were researched. This paper is based on data obtained from a questionnaire survey conducted among the total of 320 households residing in the two selected wards. The questionnaire focussed on, among other things, the households' settlement trajectory, their access to land and labour, changes in entitlement to land, the job and educational careers of the settlers' off spring, as well as social and economic baseline data. These data is supported by in-depth case studies of 22 settler-households focussing on their migration/settlement trajectories, as well as a number of key-informant interviews.

The paper begins with an outline of the planned settlement process in the Terai region with specific focus on the

circumstances of resettlement in Chitwan District. The paper then turns to an assessment of major changes in land use in Chitwan. It is maintained that the small farmers depend on a land use system characterized by an unsuccessful intensification and modernization of the agriculture. The subsequent section deals with the changes in land tenure characterized by the process of fragmentation of land-holdings. The paper is closed with a short conclusion regarding the prospects of environmental and social sustainability in the Terai Region.

Planned settlement in the Terai region

Until the beginning of this century, the main part of the plain areas of Nepal (the Terai region) was under forest (Ghimire 1992). The region was sparsely populated by ethnic groups stemming from India, such as the Tharus and Maithalis which had acquired some resistance against the infectious malaria raging the region. During the Rana period, from the middle of the 19th century and ending in 1951 (Rose and Scholz 1980), there had been several attempts to attract farmers from the Hill region in order to settle in the Terai region of Nepal. However, migration into the area was very limited, not least, due to the unstable health situation.

The initial state-backed land colonization efforts that were made during the Rana period focussed on senior government officials stationed in the region. Through land grants offered by the state they became local landlords who were further granted by the privilege to levy taxes from local farmers (Ghimire 1992). However, the landlords (zamindars) had huge problems of attracting agricultural labourers among the Nepalese Hill population. Only a smaller group from the southern part of the Hill region dared to settle in the region and mainly in order to escape repression, enforced slavery, military service, corvee duties and excessive taxation imposed on them by the Ghorke rulers (Ghimire 1992, Agergaard 1998). Hence, the landlords had to rely on the labour power of the region's original population and imported labourers from India.

The process of considerable settlement in the Terai region started to take place in the wake of democracy after the termination of Rana ruling in 1951, due to the systematic and planned efforts to settle Hill farmers in Terai. The first settlement schemes were organised as local-wise development programmes and resulted in the foundation of a national organization, the Nepal Resettlement Company,

in 1961. Subsequently, land has been distributed in different resettlement programmes in most of the Terai districts (Thapa and Weber 1986, Ghimire 1992, Agergaard 1998). The different programmes were aimed at various target groups, i.e. landless farmers, ex-servicemen, retired government personnel. However, the settlement programmes have attracted many others than the target groups, not least, Hindu-caste land-hungry farmers from the southern parts of the Hill region (Müller-Böker 1995, Agergaard 1998). The result has been a dramatic regional redistribution of the Nepalese population since the 1950s and today more than 50 per cent of the country's population live in the Terai region (CBS 1993).

The planned resettlement of Hill farmers in the Terai region has been guided by a combination of demographic, economic and socio-political objectives (Shrestha 1991). During the first half of the century the population had increased dramatically, and the opening of frontier land was seen as a way of easing population pressures in the Hill region and a way of creating a regional balance in the distribution of population and resources (Karan and Ishii 1996, Agergaard 1998). Resettlement of the Hill population was also part of an agrarian development strategy in order to redistribute land between the farmers and to boost agricultural production (Shrestha 1991, Sill and Kirkby 1991, Müller-Böker 1995). Finally, it has been argued that settlement in Terai should be seen as a socio-political strategy of relocating discontented elements of the Nepalese population in order to pacify peasant revolt (Seddon 1988, Conway and Shrestha 1985, Shrestha 1990, 1991, Ghimire 1993).

The first resettlement scheme was implemented in the Chitwan District from 1956 onwards. The project (Rapti Valley Development Programme - RVDP) was spurred by massive landslides in the Hill region in 1951 and again in 1953-54. Considerable areas of farmland were destroyed during these years and the result was increasing food shortages, poverty and landlessness. Hence, the original objective of the planned settlement in Chitwan Rapti Valley was to settle victims of natural disasters. The efforts of the RVDP as regards distribution of land and the provision of infrastructure and socio-economic services was further backed up by a WHO/USAID DDT-spraying programme in the malarious Rapti Valley.

The distribution of land followed certain guidelines as regards which population groups to be considered. Highest priority was given to the genuinely landless people who would farm themselves. Second priority was given to the labourers already residing in the district and flood victims without any land. Third priority was given to people with an agricultural background or training, and of 'good health and character' and finally retired government servants and the like were to be considered (Dussenberry 1958, Donner 1967, Shrestha 1991). In practice farmers had to apply for a land grant. Either, they could sign up when resettlement committees were travelling in the adjacent Hill Districts in order to inform groups of landless, floods victims etc. about the programme or they could go to the RVDP office in Bharatpur, which to the Hill farmers meant a long and difficult journey. Settlement took place as household settlement since the success of settlement was dependent on suf-

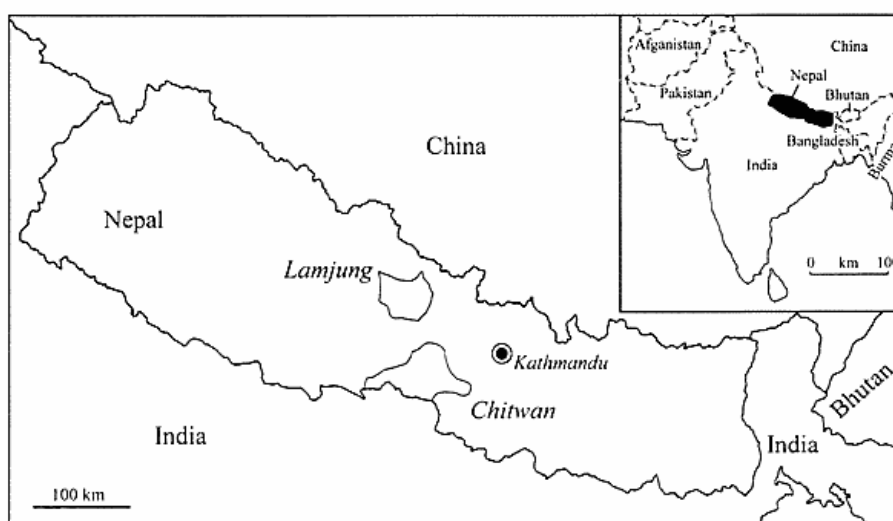


Figure 1: The location of Chitwan and Lamjung districts in Nepal and South Asia.

ficient labour power (Agergaard 1998). Accordingly, the farmers were also given rice, oil etc. in order to feed the household while they were busy clearing the land and starting their agricultural production and the RVDP also offered to clear at least one fourth of the settlers' land in order to get the agricultural production started.

Despite the good intentions of the RVDP, analyses of the planned settlement period have almost all agreed that the process of planned settlement in Chitwan did not match the intentions of the programme. In his report from 1958, Dussenberry emphasizes that the project faces considerable problems regarding the procedures for handing over the land. Similarly, Kansakar (1979) reveals how the scheme was characterized by misbehaviour, nepotism and patronage, all of which resulted in a large number of landless and flood victims being unable to obtain land under the programme. Furthermore, the same plot of land was sometimes allotted to several people which resulted in disputes over land rights (Kansakar 1979). Furthermore, socio-economic analyses have concluded that the programme was in disfavour of the ones in most need of land, since upper-caste status and prior economic performances positively affected the odds of getting a land grant (Dignan et.al 1989, Shrestha 1989).

The RVDP programme was closed in 1964, and was followed by the distribution of land certificates according to the Land Reform Act of 1964 (Bhandari 1985). Accordingly, sale and purchase of land, which had previously been prohibited, was legalized. Among the present households residing in Hanuman Nagar and Indrapuri approx. 25 per cent received a land grant before 1964, almost 40 per cent have bought their own land while less than 20 per cent have inherited their land. The remaining households are landless households comprising primarily of former tenants and farm hands that can or will no longer stay in the houses or the land of local landowners. Considering the importance of an increase of the district's population of nearly 300 per cent since 1964 (CBS 1993, Müller-Böker 1995), this distribution illustrates the significant impacts of changes in land use and land distribution that will be discussed in the subsequent section

Changing land use in Chitwan

Despite the considerable changes in land use and entitlements to land that have taken place during the preceding 35 years, the resettlement scheme in Chitwan District still

dominates the overall physical appearance of the agricultural land south of Bharatpur. The area still gives an impression of order and planning since most of the houses are distributed in the landscape according to the original laying out of land.

Originally the land was divided into larger squares divided by initial roads and paths and each square was further subdivided into plots of five bighas of land (approx. 3.4 ha) for each settler household. Land in one square was distributed at one time and subsequently land in the next square was distributed etc. This pattern is only broken by larger areas inside each square originally set aside for communal use. Because the first settlers decided to build their houses at their new land, the formation of village settlements have only developed slowly in relation to the development of local markets, and despite the ongoing process of fragmentation of land-holdings, houses are still almost evenly distributed in the landscape with few clusters of houses appearing. However, at the communal land there are found some tendencies of clustering because groups of landless households little by little have managed to encroach on the public land that originally hosted temples and schools only.

It is obvious that the current land use in Chitwan District, as well as other Terai districts, result from the rapid conversion of forest to farmland induced by the government-led resettlement scheme as well as further migration from the Hill regions for settlement in Chitwan District (Müller-Böker 1995, Karan and Ishii 1996). However, what is the characteristic? First, it should be maintained that agriculture makes up the most important sector in the district, although services, tourism (the Chitwan National Park) and education have increased in importance since the 1960s. At the same time, the district has only faced a limited industrialization illustrated by the low industrial employment rate showing that less than 5 per cent among the registered labour force are employed as productive labourers (Upadyaya 1994).

Rice is the most important crop in the Chitwan farming system in terms of area planted, value of sales, and as a staple food (Silwal 1995, Müller-Böker 1995, Karan and Ishii 1996). However, mustard, wheat, pulses and maize are similarly important crops in the production cycle. Originally, the Tharus in Chitwan produced dry rice varieties as well as paddy rice. Nevertheless, the settlers prefer the fine varieties of rice and practice the wet rice cultivation that they are familiar with from the mid-altitude

valleys from where most of the settlers stem. At best the subtropical climate facilitates three crops a year, depending on land quality (Müller-Böker 1995, Agergaard 1998). However, such intensive cultivation is a more recent phenomena due to the development of the Chitwan agriculture characterized by increasing pressures on arable land. The result has been an intensification of the land use system by the abandonment of fallow systems.

During the first centuries of settlement in the district, one or two periods of cultivation were followed by fallow and green fallow for the livestock. The settlers were copying the traditional incorporation of animal husbandry into the fallow system known from the up-land farm soils. The traditional production system secured an important transfer of nutrients from forest to farmland through composting and formed the basis for maintaining the soil fertility (Zurick 1988). According to the settlers, this practice in combination with the conversion of virgin forest land and easy access to manure secured excellent soil fertility for the first 10-15 years (1956-1960/70). Due to, among other things, the incorporation of the communal land into the crop system and the abandonment of fallow periods, available grazing land has decreased. Accordingly, farmers have to stall-feed their livestock and subsequently disperse the manure on the fields, operations which are highly time consuming and the reason why the farmers' holdings of livestock have decreased. Consequently, the balance between livestock and crop production has continuously been changed.

In spite of the farmers' complaints regarding decreasing soil fertility Burton et. al. (1989) conclude that the intensification from one to two or three crop rotations may have a positive effect on soil fertility, and that triple rather than double annual cropping has improved the nutrient status. Not least, the advantage of providing a crop cover over the soil in the pre-monsoon season has been critical in controlling soil erosion. However, their results are based on controlled experiments, and the experiences of the farmers in Hanuman Nagar and Indrapuri seem to be somewhat different.

Biot et. al. (1995) maintain that the attempts to raise yields in Nepal have been based on simple technology and have often been developed in different environments from the ones in which they are applied. Experiences from Chitwan show that the integration of improved varieties and agrochemicals into the agricultural system, in relation to the more intensive land use, the easy accessibility of the

north Indian markets and the increasing agricultural extension service often have failed. The process of modernization of the Chitwan agriculture, which has speeded up throughout the previous 15-20 years, include, besides the introduction and incorporation of new improved varieties and the increasing use of fertilizer, a better provision of irrigation. However, the irrigation system does not function satisfactorily, and the farmers experience huge fluctuations in yields depending on the irrigation facilities. Furthermore, the extension service is to blame for the unsuccessful modernization process. Interviews among the farmers in Chitwan support the concordant views emphasizing the inadequate extension service and the lack of knowledge among the farmers regarding a proper use of modern agricultural inputs. Furthermore, the local extension officers complained about the inadequate supervision they gain from the Agricultural Ministry and its departments (Agergaard 1998).

The inadequate implementation of improvements and the misguiding of extension workers have resulted in the farmers' reluctance to look up the local extension officers. However, the deficiencies of agricultural development programmes and their implementation are not alone to be blamed for the inadequate use of modern inputs in the Chitwan agriculture. The local extension officer drew attention to at least two related problems: the competition between various agricultural development programmes, implemented by the Rampur Agricultural University (localized in the resettlement area) and the distribution of fertilizer and seeds through the locale wholesale society (the cooperative).

The recent implementation of a livestock-programme for improved dairy stocks illustrates the competing agricultural development programmes. From this programme the farmers have experienced a ready availability of services such as free medicine making not so generous programmes less attractive. In the cooperative, where the farmers buy seeds, fertilizer, oil, kerosene, sugar, salt and other articles for daily use, it is the business manager, who is generally asked for advice concerning the quantity of fertilizer, pesticides, and improved seeds etc. However, considering the important role as agricultural adviser, it is obvious that he has limited requirements for doing this job. The business manager, who is a high caste intellectual, has a BA in arts rather than an agricultural education, a fact that may support the extension officer's complaint.

Proving whether soil fertility is decreasing and/or yields

are declining is difficult. However, it is argued that the combination of increasing pressures on arable land, the decrease of fallow periods, the decline of grazing land and therefore a reduction of manure available, and an unsuccessful agricultural modernization process, challenge the effectiveness and sustainability of the Chitwan land use system.

Fragmentation of land-holdings

Entitlement to land is a key to subsistence, welfare and status in Nepal (Müller-Böker 1995). Land is the primary means to production but land also acts as a sort of deposit of 'family' capital which can be used as a guarantee for temporary loans etc., or as a source of investment. Furthermore, access to land is a symbol of wealth, status and power. Accordingly, access to arable land and the changes in land tenure are indicative of the settlers' ability to maintain a foothold at the frontier. This assumption was further supported by focus group discussions and the initial discussions of criteria for status and wealth ranking of the studies areas, since I found a general agreement that entitlement to land was the main criterion for social rank. Moreover, the limitation of income alternatives to farming, accentuates the importance of land. Nevertheless, it is important to be precautionous when using land tenure and changes in land-holding size as an indicator of socio-economic stability. Besides the importance of other sources of income available, the number of dependent household members and the composition of land qualities should be considered.

Land-holdings of 4-5 bighas of land (2.5-3 ha) were the smallest land-holdings distributed within the planned settlement programme in Chitwan. As mentioned previously, it was against the initial rules and regulations to subdivide these small land-holdings. However, preceding the Land Reform Act of 1964 the process of fragmentation of land-holdings was legalized. Subsequently, the fragmentations of land-holdings have increased and currently a household that possesses 5 bigha (3.4 ha) of land is an exception: only 4 per cent of the households in Hanuman Nagar and no households in Indrapuri possess more than 5 bighas of land (cf. table 1).

The process of fragmentation of land-holdings may be researched in various ways. Bhandari (1985) has made use of land records from the District Land Revenue office from

1964, 1969 and 1983 which enabled him to register how changes in the landowners' possessions altered over time. However, he was not able to relate this information to the household level. My data take their point of departure in the household and its information on land-holding size, changes in land-holding size and stated reasons for changes, if any. Besides the uncertainty of peoples' own information regarding the possession of land, one obvious problem in assessing the dimensions on change is the lack of information on households who have sold their property and have left (a general problem in most migration and settlement research). Accordingly, the subsequent quantitative reflections on the fragmentation of land-holdings should be seen in that perspective.

The distribution of households according to land-holding size in Hanuman Nagar and Indrapuri in 1994 compared to similar data for Terai in 1974 are illustrated in table 1. The data show that the number of households possessing less than 0.68 ha has increased considerably since the 1970s which support the assumption that the process of settlement in the Terai more generally and Chitwan District

<i>Strata size group (ha)</i>	<i>Households in Hanuman Nagar (1994)</i>	<i>Households in Indrapuri (1994)</i>	<i>Households in Terai (1974)</i>
<i>0.00 - 0.68</i>	64	61	24
<i>0.69 - 1.69</i>	25	30	23
<i>1.70 - 3.39</i>	7	9	21
<i>3.40 - 5.08</i>	2	-	10
<i>5.09 - 6.77</i>	2	-	7
<i>6.78 - 10.18</i>	-	-	7
<i>10.19 - 13.54</i>	-	-	4
<i>Above 13.54</i>	-	-	4
<i>Total (no. of households)</i>	100% (122)	100% (178)	100% (*)

Table 1: Households in Hanuman Nagar and Indrapuri distributed according to land-holding size (1994) compared to average figures for Terai (1974).

Source: The 1994 data is based on original data from the authors research. The 1974 data stems from the Farm Management Survey, cited in Feldman & Fournier (1976).

Note: () sample data from the whole district was used for this analysis, however, it is unknown to the author how many households the survey covers.*

specifically has resulted in increased landlessness and near-landlessness among the farming population (Conway and Shrestha 1981, Shrestha and Conway 1985, Shrestha 1989, Dignan et. al. 1989, Thapa 1989, Ghimire 1992). The measured changes might be overestimated due to the differences in counting methods: Feldman and Fournier (1976) note that their figures might be biased in favour of larger size farms and my data might be biased in the opposite direction, since big land-holdings are almost nonexistent in Hanuman Nagar and Indrapuri. However, these reservations cannot explain the huge deviation between the figures of Hanuman Nagar and Indrapuri in the 1990s and the data for Terai in the 1970s.

The fragmentation process can also be illustrated as the correlation between arable land and the population. As mentioned previously, the area of arable land in Chitwan has increased since 1964, Bhandari estimates a doubling from 1964 to 1984. However, during the same period the number of households has increased seven times (Bhandari 1985). Table two illustrates the proportion of fragmented land-holdings in Hanuman Nagar and Indrapuri and the stated reasons for loss of land. More than 50 per cent of the total number of households have lost land compared to their maximum entitlement to land. While increasing population pressures are among the structural explanations for the fragmentation process, the stated reasons for loss are more varied.

Close to 60 per cent state selling of land as the main reason for their loss of land, while close to 40 per cent have

lost land due to household separation. However, the selling off of land seems to have halted. Separation of households seems to be an inevitable occurrence in the Nepalese society and, as predicted in the 1970s by Feldman and Fournier (1976), the relative success of the settlement programme has easily been caught up by the process of household separation and the increasing demands for cash. Today farmers only sell small pieces of land, maybe one or two katthas (0.07 ha) at a time. Prices have gone up considerably in Chitwan and irrigated land situated close to a gravel road and particularly if there is also access to electricity, has reached tremendous prices - maybe one million rupees (approx. 25,000 US dollars) for only one kattha of land. The purchase of land demands a considerable surplus in cash and the present newcomers are often households from the Hill region who want to extend their assets to more comfortable surroundings.

Previous research has concluded that the fragmentation of land-holdings is one of the most serious features of the development process in Chitwan District (Feldman and Fournier 1976; Bhandari 1985; Conway and Shrestha 1985; Müller-Böker 1995): a conclusion that is supported by my data. Furthermore, I conclude that the fragmentation process covers two parallel developments. First, that to a majority of households, the general land-holding size has decreased to a degree that challenges the potentials for supporting the households. Seddon et. al. (1979) have estimated that 1.5 hectares of unirrigated land are the threshold size for a Terai farm for it to be capable of producing any surplus. Second, that land, especially in the peri-urban areas of Bharatpur, has become an investment for Hill farmers seeking an easier lifestyle and less for improved agriculture practices and outputs. Hence, from a socio-economic point of view the livelihood of the majority of farming households is threatened and considering the limited alternative employment opportunities in the area, the households' livelihoods can only be supported by labour migrations to India, involvement in the Nepalese or Indian army and other similar strategies (Agergaard 1998).

Conclusion

Considerable changes in land use and land tenure are critical consequences of more than 40 years of human settlement in Chitwan District. The land use changes are characterized by a combination of factors that threatens the pre-

<i>Total number of households that have possessed land</i>	258 (*)
<i>Total number of households that have kept their land</i>	126
<i>Total number of households that have lost land</i>	132
<i>Number of households that state selling of land as the reason for loss of land</i>	77
<i>Number of households that state household separation as the reason for loss of land</i>	49
<i>Number of households that do not state any reason for the loss of land</i>	7

Table 2: Fragmentation of land-holdings and stated reasons for loss of land.

Source: The data is based on original data from the authors research.

Note: () 86 per cent of the total no. of households.*

sent and future soil fertility and agricultural outputs of the area. The dim prospects of the land use system are further emphasized by the changes in land tenure characterized by the process of fragmentation of land-holdings. It is concluded that within the researched areas the development has come to a stage where the majority of households may be unable to support themselves from their agricultural production. Considering the limitation of employment alternatives, this development seems to result in labour migration of a considerable number of young men.

It is probably an exaggeration to classify the development in Chitwan District by the concept of environmental criticality. However, the development is no doubt characterized by a trajectory that in a not so far future threatens to narrow the range of possibilities for human use and a proper livelihood for the majority of farming households. Accordingly, I think it is time for politics and planning in Nepal to extend the strong focus on the Hill environments to include the dim social and environmental prospects of the Terai region, exemplified by 40 years of settlement in Chitwan District.

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References

Agergaard, J. (1998): *Unsettled settlement: A study of the process of migration from Lamjung District and settlement in Chitwan District of Nepal*. Unpublished Ph.D. Thesis, Department of Geography, University of Copenhagen.

Bhandari, B. (1985): Fragmentation of land-holding size in Chitwan: An Analysis of land records from 1964 to 1983. *Economic Journal of Nepal*, 8 (4): 21-28.

Biot, Y., Blaikie, P., Jackson, C. & Palmer-Jones, R. (1995): Rethinking research on land degradation in developing countries. World Bank Discussion Paper, 289. Washington D. C.

Blaikie, P. & Brookfield, H. (1987): *Land degradation and society*. London and New York, Methuen.

Brookfield, H., Potter, L. & Byron, Y. (1995): *In place of the forest. Environmental and socio-economic transformation in Borneo and the eastern Malay Peninsula*. Tokyo, New York and Paris, United Nations University Press.

Burton, S., Shah P. B. & Schreiber, H. (1989): Soil degradation from converting forest land into agriculture in the Chitawan District of Nepal. *Mountain Research and Development*, 9 (4): 393-404.

Central Bureau of Statistics (CBS) (1993): *Statistical year book of Nepal 1993*. HMG Planning Commission Secretariat. Kathmandu.

Conway, D. & Shrestha, N. R. (1981): *Causes and consequences of rural-to-rural migration in Nepal. Final Report*. Indiana, Department of Geography, Indiana University.

Dignan, T., Haynes, E., Conway D. & Shrestha, N. R. (1989): Land and landlessness among rural-to-rural migrants in Nepal's Terai Region. *International Regional Science Review*, 12 (2): 189-209.

Donner, W. 1967. *Remarks on the Rapti Valley Development Project*. Kathmandu, HMG.

Dussenberry, H. L. (1958): *Report on Rapti Valley Development Project*. Kathmandu, HMG.

Eckholm, E. P. (1976): *Loosing ground: Environmental stress and world food prospects*. New York, Norton.

Feldman, D. and Fournier, A. (1976): Social relations and agricultural production in Nepal's Terai. *Journal of Peasant Studies*, 3 (4): 447-464.

Gaige, F. (1975): *Regionalism and national unity in Nepal*. Berkeley and Los Angeles, University of California Press.

Ghimire, K. (1992): *Forest or farm: The politics of poverty and land hunger in Nepal*. Delhi, Oxford University Press.

Gurung, O. (1994): Historical dynamics of resource degradation in the Nepal Himalayas. Pp. 82-96 in Allen, M. (ed.): *Anthropology of Nepal. People, problem and processes*. Kathmandu, Mandala Book Point.

Ives, J. D. (1987): The theory of Himalayan environmental degradation: its validity and application challenged by recent research. *Mountain Research and Development*, 7 (3).

Ives, J. D. & Messerli, B. (1989): *The Himalayan dilemma: Reconciling development and conservation*. London, Routledge.

Kansakar, V. B. S. (1979): *Effectiveness of planned resettlement programme in Nepal*. Kathmandu, CEDA.

Karan, P. P. & Ishii, H. (1996): *Nepal. A Himalayan Kingdom in transition*. Tokyo. United Nations University Press.

Khadka, N. (1994): *Politics and development in Nepal*. Delhi, Nirala.

Metz, J. J. (1991): A reassessment of the causes and severity of Nepal's environmental crisis. *World Development*, 19 (7): 805-820.

Müller-Böker, U. (1993): Tharus and pahiriyas in Chitwan: Some observations concerning the question of multiethnicity in Nepal. Pp. 279-294 in Toffin, G (ed.): *Nepal. Past and present*. New

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References

Agergaard, J. (1998): *Unsettled settlement: A study of the process of migration from Lamjung District and settlement in Chitwan District of Nepal*. Unpublished Ph.D. Thesis, Department of Geography, University of Copenhagen.

Bhandari, B. (1985): Fragmentation of land-holding size in Chitwan: An Analysis of land records from 1964 to 1983. *Economic Journal of Nepal*, 8 (4): 21-28.

Biot, Y., Blaikie, P., Jackson, C. & Palmer-Jones, R. (1995): Rethinking research on land degradation in developing countries. World Bank Discussion Paper, 289. Washington D. C.

Blaikie, P. & Brookfield, H. (1987): *Land degradation and society*. London and New York, Methuen.

Brookfield, H., Potter, L. & Byron, Y. (1995): *In place of the forest. Environmental and socio-economic transformation in Borneo and the eastern Malay Peninsula*. Tokyo, New York and Paris, United Nations University Press.

Burton, S., Shah P. B. & Schreiber, H. (1989): Soil degradation from converting forest land into agriculture in the Chitawan District of Nepal. *Mountain Research and Development*, 9 (4): 393-404.

Central Bureau of Statistics (CBS) (1993): *Statistical year book of Nepal 1993*. HMG Planning Commission Secretariat. Kathmandu.

Conway, D. & Shrestha, N. R. (1981): *Causes and consequences of rural-to-rural migration in Nepal. Final Report*. Indiana, Department of Geography, Indiana University.

Dignan, T., Haynes, E., Conway D. & Shrestha, N. R. (1989): Land and landlessness among rural-to-rural migrants in Nepal's Terai Region. *International Regional Science Review*, 12 (2): 189-209.

Donner, W. 1967. *Remarks on the Rapti Valley Development Project*. Kathmandu, HMG.

Dussenberry, H. L. (1958): *Report on Rapti Valley Development Project*. Kathmandu, HMG.

Eckholm, E. P. (1976): *Loosing ground: Environmental stress and world food prospects*. New York, Norton.

Feldman, D. and Fournier, A. (1976): Social relations and agricultural production in Nepal's Terai. *Journal of Peasant Studies*, 3 (4): 447-464.

Gaige, F. (1975): *Regionalism and national unity in Nepal*. Berkeley and Los Angeles, University of California Press.

Ghimire, K. (1992): *Forest or farm: The politics of poverty and land hunger in Nepal*. Delhi, Oxford University Press.

Gurung, O. (1994): Historical dynamics of resource degradation in the Nepal Himalayas. Pp. 82-96 in Allen, M. (ed.): *Anthropology of Nepal. People, problem and processes*. Kathmandu, Mandala Book Point.

Ives, J. D. (1987): The theory of Himalayan environmental degradation: its validity and application challenged by recent research. *Mountain Research and Development*, 7 (3).

Ives, J. D. & Messerli, B. (1989): *The Himalayan dilemma: Reconciling development and conservation*. London, Routledge.

Kansakar, V. B. S. (1979): *Effectiveness of planned resettlement programme in Nepal*. Kathmandu, CEDA.

Karan, P. P. & Ishii, H. (1996): *Nepal. A Himalayan Kingdom in transition*. Tokyo. United Nations University Press.

Khadka, N. (1994): *Politics and development in Nepal*. Delhi, Nirala.

Metz, J. J. (1991): A reassessment of the causes and severity of Nepal's environmental crisis. *World Development*, 19 (7): 805-820.

Müller-Böker, U. (1993): Tharus and pahiriyas in Chitwan: Some observations concerning the question of multiethnicity in Nepal. Pp. 279-294 in Toffin, G (ed.): *Nepal. Past and present*. New

Delhi, Sterling Publishers Private Limited

Müller-Böker, U. (1995): *Die Tharu in Chitwan. Kenntnis, bewertung und nutzung der natürlichen umwelt in südlichen Nepal*. Stuttgart, Franz Steiner Verlag.

Nepal, S. K. & Weber, K. E. (1993): *Struggle for existence. Park-people conflict in the Royal Chitwan National Park, Nepal*. Studies in Regional Environment Planning, HSD Monograph, 28. Bangkok, Asian Institute of Technology.

Redclift, M. (1987): *Sustainable development: Exploring the contradictions*. London, Methuen.

Redclift, M. (1991): The multiple dimensions of sustainable development. *Geography*, 76 (1): 36-42.

Rose, L. E. & Scholz, J. T. (1980): *Nepal. Profile of a Himalayan kingdom*. New Delhi, Selectbook Service Syndicate.

Seddon, D. (1988): *Nepal. A state of poverty*. New Delhi, Vikas Publishing House.

Seddon, D. et al. (1979): *Peasant and workers in Nepal*. Warminster, Aris and Philips.

Shrestha, N. R. (1989): Frontier Settlement and Landlessness among Hill Migrants in Nepal Terai. *Annals of the Association of American Geographers*, 79 (3): 370-389.

Shrestha, N. R. (1990): *Landlessness and migration in Nepal*. Boulder, San Francisco, London, Westview Press.

Shrestha, N. & Conway D. (1985): Issues in population pressure, land resettlement, and development: The case of Nepal. *Studies in Comparative Development*, 20 (1): 55- 82.

Sill, M. & Kirkby, J. (1991): *The atlas of Nepal in the modern world*. London, Earth Scan Publications.

Silwal, U. K. (1995): *Population growth and agricultural change in Nepal*. New Delhi, Vikas Publishing House Pvt Ltd.

Thapa, P. (1989): *Nepal: Socio-economic change and rural migration*. New Delhi, Vikas Publishing House Pvt. Ltd.

Thapa, G. B. & Weber, K. E. (1986): *Land settlement in Nepal. Comparative study of four types of planned and spontaneous settlement*. Studies on Human Settlements Development in Asia. HSD Monograph 9. Bangkok, Asian Institute of Technology.

Upadyaya, B. (1994): *Industrial geography of Nepal*. Kathmandu, Ratna Pustak Bhandar.

Zurick, D. N. (1988): Resource needs and land stress in Rapti Zone, Nepal. *Professional Geographer*, 40 (4): 428-444.

sent and future soil fertility and agricultural outputs of the area. The dim prospects of the land use system are further emphasized by the changes in land tenure characterized by the process of fragmentation of land-holdings. It is concluded that within the researched areas the development has come to a stage where the majority of households may be unable to support themselves from their agricultural production. Considering the limitation of employment alternatives, this development seems to result in labour migration of a considerable number of young men.

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Agergaard, J. (1998): *Unsettled settlement: A study of the process of migration from Lamjung District and settlement in Chitwan District of Nepal*. Unpublished Ph.D. Thesis, Department of Geography, University of Copenhagen.

Bhandari, B. (1985): Fragmentation of land-holding size in Chitwan: An Analysis of land records from 1964 to 1983. *Economic Journal of Nepal*, 8 (4): 21-28.

Biot, Y., Blaikie, P., Jackson, C. & Palmer-Jones, R. (1995): Rethinking research on land degradation in developing countries. World Bank Discussion Paper, 289. Washington D. C.

Blaikie, P. & Brookfield, H. (1987): *Land degradation and society*. London and New York, Methuen.

Brookfield, H., Potter, L. & Byron, Y. (1995): *In place of the forest. Environmental and socio-economic transformation in Borneo and the eastern Malay Peninsula*. Tokyo, New York and Paris, United Nations University Press.

Burton, S., Shah P. B. & Schreiber, H. (1989): Soil degradation from converting forest land into agriculture in the Chitawan District of Nepal. *Mountain Research and Development*, 9 (4): 393-404.

Central Bureau of Statistics (CBS) (1993): *Statistical year book of Nepal 1993*. HMG Planning Commission Secretariat. Kathmandu.

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Donner, W. 1967. *Remarks on the Rapti Valley Development Project*. Kathmandu, HMG.

Dussenberry, H. L. (1958): *Report on Rapti Valley Development Project*. Kathmandu, HMG.

Eckholm, E. P. (1976): *Loosing ground: Environmental stress and world food prospects*. New York, Norton.

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Ives, J. D. & Messerli, B. (1989): *The Himalayan dilemma: Reconciling development and conservation*. London, Routledge.

Kansakar, V. B. S. (1979): *Effectiveness of planned resettlement programme in Nepal*. Kathmandu, CEDA.

Karan, P. P. & Ishii, H. (1996): *Nepal. A Himalayan Kingdom in transition*. Tokyo. United Nations University Press.

Khadka, N. (1994): *Politics and development in Nepal*. Delhi, Nirala.

Metz, J. J. (1991): A reassessment of the causes and severity of Nepal's environmental crisis. *World Development*, 19 (7): 805-820.

Müller-Böker, U. (1993): Tharus and pahiriyas in Chitwan: Some observations concerning the question of multiethnicity in Nepal. Pp. 279-294 in Toffin, G (ed.): *Nepal. Past and present*. New